WHAT IS CLAIMED IS:

1. A method of maintaining frame synchronization in a multicarrier modulation transmission system in which a synchronizing frame containing a synchronizing pattern is periodically transmitted, comprising the steps of:

storing complex amplitudes of the synchronizing frame;

correlating the complex amplitudes of the synchronizing frame with stored information representing the synchronizing pattern, thereby to produce a correlation result; and

determining whether the correlation result falls below a threshold value, indicating a loss of frame synchronization, and in this event:

performing a plurality of correlations between the stored information and the stored complex amplitudes in each case multiplied by a respective complex value representing a respective complex derotation of the stored complex amplitudes, each complex derotation corresponding to a respective time shift of the synchronizing frame, thereby to produce a plurality of correlation results each corresponding to a respective time shift;

determining from the plurality of correlation results a time shift for restoring frame synchronization; and

adjusting a frame boundary in accordance with the determined time shift to restore frame synchronization.

2. A method as claimed in claim 1 wherein each correlation result is produced by multiplying each complex amplitude by a corresponding complex amplitude from the stored information representing the synchronizing pattern, and summing the real parts of the complex products.

3. A method as claimed in claim 2 and including the step of weighting the complex amplitudes being multiplied.

4. A method as claimed in claim 3 wherein the weighting for each complex amplitude being multiplied is dependent upon a signal-to-noise ratio of a multicarrier channel associated with the respective complex amplitude.

5. A method as claimed in claim 1 wherein the step of determining from the plurality of correlation results a time shift for restoring frame synchronization comprises determining a best correlation result from the plurality of correlations and selecting the time shift corresponding to the best correlation result if the best correlation result exceeds a second threshold value.

6. A method as claimed in claim 5 wherein the second threshold value is greater than the threshold value for indicating a loss of frame synchronization.

7. A method as claimed in claim 1 for a discrete multitone modulation transmission system, including the steps of:

using a tone having a predetermined frequency for frequency synchronization between a transmitter and a receiver of the system;

at the transmitter, converting complex amplitudes in the frequency domain into time domain values using an N-point Inverse Fast Fourier Transform;

sampling time domain values at the transmitter at a sampling frequency which is j times the predetermined frequency, where j is an integral power of two; and

at the receiver, converting time domain values into complex amplitudes in the frequency domain using an N-point Fast Fourier Transform;

wherein each of said complex derotations corresponds to a respective one of N / j time shifts within the duration of one frame.

8. A method as claimed in claim 7 wherein the synchronizing frame is periodically transmitted once every Q frames, where Q is an integer greater than N / j.

9. A method as claimed in claim 8 wherein said plurality of correlations comprise N / j correlations corresponding to time shifts in either direction up to half the duration of one frame.

10. A method as claimed in claim 9 wherein N = 512, j = 8, and Q = 69.

11. A method as claimed in claim 7 wherein the step of determining from the plurality of correlation results a time shift for restoring frame synchronization comprises determining a best correlation result from the plurality of correlations and selecting the time shift corresponding to the best correlation result if the best correlation result exceeds a second threshold value.

12. A method as claimed in claim 11 wherein the second threshold value is greater than the threshold value for indicating a loss of frame synchronization.

13. A method as claimed in claim 7 wherein each correlation result is produced by multiplying each complex amplitude by a corresponding complex amplitude from the stored information representing the synchronizing pattern, and summing the real parts of the complex products.

14. A method as claimed in claim 13 and including the step of weighting the complex amplitudes being multiplied.

15. A method as claimed in claim 14 wherein the weighting for each complex amplitude being multiplied is dependent upon a signal-to-noise ratio of a multicarrier channel associated with the respective complex amplitude.

16. A multicarrier modulation transmission system receiver comprising:

a Fast Fourier Transform (FFT) unit for transforming time domain values into complex amplitudes in the frequency domain;

a buffer for supplying received time domain values to the FFT unit in accordance with a frame boundary;

a correlator for correlating complex amplitudes of a synchronizing frame of the system with a synchronizing pattern stored at the receiver to produce a correlation result; and

a control unit responsive to the correlation result being below a threshold value to adjust the frame boundary by a time shift determined by performing a plurality of correlations between the stored synchronizing pattern and the complex amplitudes in each case multiplied by a respective complex value representing a respective complex derotation of the complex amplitudes corresponding to a respective time shift of the synchronizing frame, and selecting the best correlation result.

17. A receiver as claimed in claim 16 and including a multiplier for weighting the synchronizing pattern in dependence upon signal-to-noise ratios of the multicarrier channels.